

ART. XV.—*The largest Australian Trilobite hitherto discovered.*

(With Plate XI.)

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[Read 14th December, 1893.]

Amongst a large suite of interesting fossil organic remains discovered by Mr. George Sweet, F.G.S., at Delatite, is what I take to be a large ill-preserved Trilobite pygidium, at any rate I can see no other feasible explanation of the specimen. It consists of a Crustacean plate on the surface of a piece of flaggy calcareous shale, compressed flat, and somewhat obliquely distorted. In its original condition, it must have been sub-semicircular, and rather acuminate posteriorly, six inches across the anterior, or pygidio-thoracic edge, and with the lateral angles rounded. The longitudinal (oblique) measurement is four and a half inches, but in the undistorted state this would probably represent about five inches. On the left hand side, when facing the observer, are five coalesced pleural segments, probably portion of a sixth, and possibly a seventh, the two last very faintly preserved. On the right hand side four only are visible, as the remainder are hidden by an intractable coating of matrix, which also obscures any trace of axial segmentation. If, therefore, my conception of this fossil be correct, it exhibits, as it should do, and allowing for the oblique distortion it has undergone, bilateral symmetry. It is unfortunate that the central portion is so completely hidden by matrix that cannot be removed, for on the axial features, the question of generic identity depends. The entire surface is minutely pitted; and the point that appears to represent the apical centre, or centre of the posterior margin, is apparently emarginate.*

The principal points which militate against the Trilobite nature of our fossil are: (1) the absence of any trace of axial

* Too much stress, however, cannot be laid upon this point, owing to the condition of the specimen.

segmentation, notwithstanding the adherent matrix; (2) the absence of any trace of a limb, or striated margin posteriorly or laterally; and (3) the presence of the apical emargination. There is, on the other hand, a definite thread-like margin round the sides and hinder portion, which at once dispels the idea that the plate might be a portion of some other organism; and I think that the lateral segmentation radiating outwards on both sides places its identity, so far as the generalised systematic position is concerned, beyond doubt, but a reference to some one of the known genera is a more difficult task. Perhaps the easiest method of arriving at a decision on this point will be by a process of elimination. The characters, so far as they can be deciphered, at once forbid the entrance of the fossil within the families of the Harpedidæ, Remopleuridæ, Olenidæ, Conocephalidæ, Calymenidæ, Æglinidæ, Cheiruridæ, Enebrinuridæ, Didymenidæ, Acidaspidæ, Lichadidæ, Phacopidæ, Proetidæ, Trinuelidæ, and Agnostidæ, thus leaving the Asaphidæ, Bronteidæ, and Illænidæ to choose from.

In the Asaphidæ, *Asaphus* and *Ogygia* being the typical genera, the caudal shield is often of large size, and in some species of the former obscurely segmented, but in other *Asaphi* both the axis and pleural segments are well defined. In *Ogygia* the tail is wide transversely, with a wide striated limb. The axis extends to the margin of the latter, whilst the pleural segments are broad and flat. In *Barrandia* both axis and the divisions of the pleuræ are quite apparent, but in *Stygina* the axis is, in fact, of the two, the more prominent; the pleural segmentation is hardly to be noticed.

In the Illænidæ, having for the type genus *Illænus* itself, the caudal shield is large in proportion to the thorax, seldom, if ever, segmented—if the rudimentary axis be left out of consideration—certainly very rarely on the pleuræ, and always convex and prominent. One of the few examples of segmentation on the pygidium in *Illænus*, known to me, is that of *I. atavus*, Eichwald* and even in this instance it is very slight.

In the Bronteidæ the tail is usually of large size in comparison with the thorax, strongly sub-semicircular, or deeply fan-shaped;

* Holm, Mém. Acad. Imp. Sci. St. Pétersbourg, 1886, xxiii., t. 7, f. 4*

the axis short and rudimentary ; the coalesced pleural segments flat, broad, and typically seven to eight on either side, with a peculiar downward curve very characteristic of the genus. In many species the limb is also wide and well-marked.

Of the three families thus selected by elimination, the Illænidæ may, I think, be discarded, leaving only the Asaphidæ and Bronteidæ to choose from.

Now, however obliquely distorted Trilobite pygidia may be, take for instance the Asaphidæ of the Tremadoc Group, amongst Lower Silurian forms, the axis is invariably perceptible to a greater or less extent ; and, had there been such an axis on Mr. Sweet's specimen, some trace of it would be visible, notwithstanding the adherent matrix, more particularly towards the apex. This, it seems to me, debars the entry of this fossil amongst the Asaphidæ ; although, it must be admitted, excepting this character, and the absence of anterior lateral fulcral-facets, the present fossil has a general resemblance to some of the *Asaphi* proper, particularly such species as *Asaphus centralis*, Conrad.*

With regard to the Bronteidæ, and a comparison with this fossil, we are met at the outset with the same axial difficulty. The small lobiform axis is usually a prominent feature, and should have left some evidence of its presence, especially along the anterior margin, although the specimen has certainly been damaged here by blows from the hammer. There should likewise have been traces of the long terminal appendage as a continuation towards the apex of the pygidium, and the anterior fulcral-facets, but both are conspicuous by their absence. The only remaining feature on which to effect a comparison is that of the coalesced pleural segments, and these are certainly more Bronteiform than *Asaphus*-like. In *Asaphus* and *Ogygia*, the coalesced segments are sometimes grooved and at other times not, but the angle that each segment forms with the median axial line is an obtuse one, at any rate in the anterior portion, and the whole radiate, as it were, from the axis throughout its entire length. In *Bronteus*, on the other hand, the similar angle is acute, the segments, in consequence of their trend from the small axial lobe at the anterior end of the pygidium, have a much greater backward

* Whitfield, Bull. American Mus. Nat. Hist., 1889, ii., No. 2, t.12.

curvature than in the two genera named. Furthermore, the segments are entire, and without grooves, separated by intercostal spaces of greater or less width, and there are no well-marked anterior facets. On these grounds, therefore, I am led to regard the present fossil as more properly appertaining to the *Bronteidae*, and possibly referable to *Bronteus* itself.

Indefinite and broad pleural segments are common to many species of *Bronteus*, becoming obsolete near the margin of the pygidium. The median appendage, however, connecting the apex of the abbreviated axis with the similar point on the posterior margin of the caudal shield is nearly always present, and generally bifurcate. No better example of such ill-defined pleurae can be adduced than that of *B. senescens*, Clarke,* although very broad segments are also present in the typical *B. flabellifer*, Goldf.† Segments of similar width, and equally lacking in definition, may also be seen in *B. campanifer*, Barr;‡ indeed in some cases they become more like broad flat folds than segments, such as those of *B. Laphami*, Whitf.§ Another point which must be taken into consideration in attempting to decipher this fossil is the alteration in appearance caused by the successive peeling-off of layers of test, the segments becoming fainter and fainter as the process goes on. This may be seen in Barrande's figures of *B. palifer*, Beyr,|| and *B. angusticeps*, Barr.¶

In regarding this pygidium as that of a *Bronteus*, there are two negative points that have to be considered. In the first place there is not the slightest trace of the projecting anterior end, or perhaps segment, of the axis, which is usually seen in this genus to protrude beyond the general fore-margin of the shield, although I have previously suggested an explanation of this. In the second place the hinder-margin seems to be emarginate, excentrically in the specimen's present state it is true, but in a position that would, in all probability, represent the middle line of the caudal shield, were it not for the distortion it has undergone. I know of no *Bronteus* with such

* Forty-second Report Trustees State Cab. Nat. Hist. New York for 1888 [1889], p. 403.

† De Koninck, Mém. Acad. R. Bruxelles, xiv., 1st pl., f. 1.

‡ Syst. Sil. Bohême, I., Atlas t.44, f. 6 and 8.

§ Geol. Wisconsin, Survey 1873-79, iv., 1882, p. 310, t. 22, f. 3.

|| Barrande, *loc. cit.*, t. 45, f. 11.

¶ *Loc. cit.*, t. 45, f. 27.

an apical break in the outline of its tail, although it is not unknown in the genus *Lichas*. These points certainly weigh against the reference of Mr. Sweet's fossil to *Bronteus*, but it is a matter for consideration, whether or no they are outweighed by those points that may be considered in favour of such a reference. The largest *Bronteus* of which I have any record is *B. Laphami*, Whitf,* with a tail measuring four inches broad, by four and a half long; and the next is *B. viator*, Barr., a tail of which, figured by Novák†, measures three and a quarter inches in length by three and a half in width. The largest described Australian *Bronteus* in *B. Jenkinsi*, E. and M.,‡ but even this, compared to the present form, is a mere pigmy.

From the point of size merely, this pygidium must represent a Trilobite well-fitted to hold its own amongst some of the largest known. For instance, taking for comparison our hitherto largest Australian *Bronteus*, *B. Jenkinsi*, we find that a pygidium possessing a length of one and a half inches represents an entire body of nearly three and a half inches. The length of our present specimen, allowing for distortion, is five inches, therefore, in the same degree of proportion, the full body would be as near as possible a foot long.

Turning to the existing record of large Trilobites we find that the *Paradoxides Tessini*, Linn.§, is twelve inches in length, the almost equally large *P. Forchammeri*, Angelin||, is ten inches in length, whilst the immense *Asaphus (Megalaspis) heros*, Dalman¶, is fourteen inches long. Mr. F. Bayan estimates that the total length of *Lichas Heberti*, judging by the size of the cephalic shield, must have been, in round numbers, between two feet and two feet six inches long**. Many other instances might be cited, including the British *Paradoxides Davidis*, Salter††, which is thirteen inches in length; and the American *Dalmanites (Coronura) mymecophorus*, Green, figured by Hall and Clarke‡‡,

* Geol. Wisconsin Survey, 1873-79, 1882, iv., p. 310, t. 22, f. 3.

† Beiträge Pal. Ost.-Ungarns, Heft. 1 and 2, 1883, t.11, f.16.

‡ Proc. Linn. Soc. N.S. Wales, 1890, v. (2), p. 502, t. 18.

§ Angelin and Lindström, Pal. Scandinavica, Pt. 1, 1878, t. 1

|| Angelin and Lindström, Pal. Scandinavica, Pt. 1, 1878, t. 2.

¶ Angelin and Lindström, Pal. Scandinavica, Pt. 1, 1878, t. 3.

** Bull. Soc. Géol. France.

†† Brit. Organic Remains, Dec. xi., 18 , t. 10.

‡‡ Pal. New York, 1888, vii., t. 15.

fourteen and a quarter inches in length. Those interested in the proportions of these gigantic Trilobites will find full data in an interesting paper recently published by Mr. J. M. Clarke,* enumerating many others than those here given, not the least interesting being the gigantic *Tretaspis grandis*, Hall†, which is believed to have attained two feet in length. Mr. Clarke remarks on this—"A size unsurpassed and unequalled by any other known Trilobite," but if Mr. Bayan's estimate of *Lichas Heberti*, Rouault, be correct, we have there a larger one.

In conclusion, believing as I do, that the fossil represents the pygidial remains of a large Trilobite related to, if not identical with the genus *Bronteus*, I suggest for it, with the view of future referencæ, the name of *Bronteus? enormis*, in relation to its size. With regard to its age it is certainly Lower Palæozoic, but I have not yet seen sufficient of the accompanying fossils to be in a position to express a more definite opinion.

DESCRIPTION OF PLATE XI.

Fig. 1. *Bronteus? enormis*, Eth. fil. Pygidium of the natural size, slightly obliquely distorted.

Fig. 2. Portion of the surface enlarged.

* 44th Ann. Report New York State Mus. for 1890 [1892], p. 111.

† *Loc. cit.*, pl. opp. p. 114.